IN THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (currently amended) A switch matrix, comprising:

at least one row conductor;

at least one column conductor, wherein each of said at least one row conductor and said at least one column conductor are capable of being driven with a predetermined voltage level, and being capable of being read therefrom a voltage level; and

a plurality of switching elements adapted to connect said at least one row conductor to said at least one column conductor, said plurality exceeding a number obtained by multiplying together a number of said at least one row conductor and a number of said at least one column conductor;

a first current path connecting said at least one row conductor and said at least one column conductor, said first current path implemented to allow current to flow bi-directionally therethrough; and

a second current path connecting said at least one row conductor and said at least one column conductor, said second current path comprising a diode ~~restricted~~ to allow current to flow only in one direction therethrough.

2. (canceled)

3. (canceled)

4. (previously presented) The switch matrix according to claim 1, wherein:

at least one of said plurality of switching elements is a temporary connection type switching element.

5. (previously presented) The switch matrix according to claim 1, wherein:

at least one of said plurality of switching elements is a momentary switch.

6. (previously presented) The switch matrix according to claim 1, wherein:

at least one of said plurality of switching elements is a persistent connection type switching element.

7. (canceled)

8. (previously presented) The switch matrix according to claim 1, wherein:

said plurality is twice a number obtained by multiplying together said number of said at least one row conductor and said number of said at least one column conductor.

9. (currently amended) A switch matrix, comprising:

a plurality of row conductors;

a plurality of column conductors, each of said plurality of row conductors and each of said plurality of column conductors are capable of being driven with a predetermined voltage level, and being capable of being read therefrom a voltage level;

a plurality of switching elements including at least one momentary push button adapted to connect at least one of said plurality of row conductors to at least one of said plurality of column conductors;

a first current path connecting at least one of said plurality of row conductors and at least one of said plurality of column conductors, said first current path implemented to allow current to flow bi-directionally therethrough and;

a second current path connecting at least one of said plurality of row conductors and at least one of said plurality of column conductors, said second current path comprising a diode ~~restricted~~ to allow current to flow only in one direction therethrough;

wherein a total number of switching elements of said plurality of switching elements exceeds a product of a total number of row conductors of said plurality of row conductors and a total number of column conductors of said plurality of column conductors; and

wherein some of said plurality of switching elements are implemented to allow current to flow bi-directionally therethrough, and others of said plurality of switching elements are restricted to allow current to flow only in one direction therethrough.

10. (original) The switch matrix according to claim 9, wherein:

said total number of switching elements is twice said product of said total number of row conductors and said total number of column conductors.

11. (canceled)

12. (canceled)

13. (canceled)

14. (currently amended) A switch matrix, comprising:

a plurality of row conductors;

a plurality of column conductors;

a plurality of momentary switching elements adapted to momentarily connect at least one of said plurality of row conductors to at least one of said plurality of column conductors; ~~and~~

a plurality of persistent switching elements adapted to persistently connect at least one of said plurality of row conductors to at least one of said plurality of column conductors;

a first current path connecting at least one of said plurality of row conductors and at least one of said plurality of column conductors, said first current path implemented to allow current to flow bi-directionally therethrough and;

a second current path connecting at least one of said plurality of row conductors and at least one of said plurality of column conductors, said second current path <u>comprising a diode</u> ~~restricted~~ to allow current to flow only in one direction therethrough;

wherein a total of said plurality of momentary switching elements and said plurality of persistent switching elements exceed a number obtained by multiplying together a number of said plurality of row conductors and a number of said plurality of column conductors; and

wherein some of said plurality of momentary switching elements are implemented to allow current to flow bi-directionally therethrough, and others of said plurality of momentary switching elements are restricted to allow current to flow only in one direction therethrough.

15. (previously presented) The switch matrix according to claim 14, wherein:

said at least one momentary switching element includes at least one push.

16. (currently amended) A method of scanning a switch matrix, comprising:

permitting at least one of a plurality of switches in a first current path connecting a row conductor and a column conductor to allow current to flow bi-directionally therethrough; and

permitting at least one of said plurality of switches in a second current path connecting said row conductor and said column conductor to allow current to flow only in one direction through a diode therethrough;

persistently connecting at least one of a plurality of row conductors to at least one of a plurality of column conductors;

driving one at a time each of said plurality of row conductors with a predetermined row voltage level;

monitoring each of said plurality of column conductors for a given voltage drop corresponding to a closed one of said plurality of switches to a driven one of said plurality of row conductors, while one of said plurality of row conductors is being driven with said predetermined row voltage level;

driving one at a time each of said plurality of column conductors with a predetermined column voltage level; and

monitoring each of said plurality of row conductors for a given voltage drop corresponding to a closed one of said plurality of switches to a driven one of said column conductors, while one of said plurality of column conductors is being driven with said predetermined column voltage level;

wherein a number of said plurality of switches is increased by said persistent connection exceeding a total number obtained by multiplying together a number of said plurality of row conductors and a number of said plurality of column conductors.

17. (previously presented) The method of scanning a switch matrix in accordance with claim 16, further comprising:

detecting a closure of a first one of said plurality of switches based on a presence of said predetermined column voltage level during monitoring of said plurality of row conductors; and

detecting a closure of a second one of said plurality of switches, said detection of said closure of said second one of said plurality of switches being based on a presence of said predetermined row voltage level during monitoring of said plurality of column conductors.

18. (previously presented) The method of scanning a switch matrix in accordance with claim 17, wherein:

said plurality of switches includes a momentary push button.

19. (previously presented) The method of scanning a switch matrix in accordance with claim 17, wherein:

said plurality of switches includes a persistent switch.

20. (previously presented) The method of scanning a switch matrix in accordance with claim 17, wherein:

said plurality of switches includes a momentary push button and a persistent switch.

21. (previously presented) The switch matrix according to claim 1, wherein:

said one direction allows current to flow from one of said at least one row, to one of said at least one column.

22. (previously presented) The switch matrix according to claim 1, wherein:

only one diode voltage drop is switchably connected between each said at least one row conductor and each said at least one column conductor.

23. (previously presented) The switch matrix according to claim 9, wherein:

said one direction allows current to flow from one of said at least one row, to one of said at least one column.

24. (previously presented) The switch matrix according to claim 9, wherein:

only one diode voltage drop is switchably connected between each said at least one row conductor and each said at least one column conductor.

25. (new) A switch matrix, comprising:

at least one row conductor;

at least one column conductor, wherein each of said at least one row conductor and said at least one column conductor are capable of being driven with a predetermined voltage level, and being capable of being read therefrom a voltage level; and

a plurality of switching elements adapted to connect said at least one row conductor to said at least one column conductor, said plurality exceeding a number obtained by multiplying together a number of said at least one row conductor and a number of said at least one column conductor;

a first current path connecting said at least one row conductor and said at least one column conductor, said first current path implemented to allow current to flow bi-directionally therethrough; and

a second current path connecting said at least one row conductor and said at least one column conductor, said second current path restricting current to flow only in one direction therethrough.

26. (new) A switch matrix, comprising:

a plurality of row conductors;

a plurality of column conductors, each of said plurality of row conductors and each of said plurality of column conductors are capable of being driven with a predetermined voltage level, and being capable of being read therefrom a voltage level;

a plurality of switching elements including at least one momentary push button adapted to connect at least one of said plurality of row conductors to at least one of said plurality of column conductors;

a first current path connecting at least one of said plurality of row conductors and at least one of said plurality of column conductors, said first current path implemented to allow current to flow bi-directionally therethrough and;

a second current path connecting at least one of said plurality of row conductors and at least one of said plurality of column conductors, said second current path restricting current to flow only in one direction therethrough;

wherein a total number of switching elements of said plurality of switching elements exceeds a product of a total number of row conductors of said plurality of row conductors and a total number of column conductors of said plurality of column conductors; and

wherein some of said plurality of switching elements are implemented to allow current to flow bi-directionally therethrough, and others of said plurality of switching elements are restricted to allow current to flow only in one direction therethrough.

27. (new) A method of scanning a switch matrix, comprising:

permitting at least one of a plurality of switches in a first current path connecting a row conductor and a column conductor to allow current to flow bi-directionally therethrough; and

restricting with a component within said second current connecting said row conductor and said column conductor to allow current to flow only in one direction therethrough;

persistently connecting at least one of a plurality of row conductors to at least one of a plurality of column conductors;

driving one at a time each of said plurality of row conductors with a predetermined row voltage level;

monitoring each of said plurality of column conductors for a given voltage drop corresponding to a closed one of said plurality of switches to a driven one of said plurality of row conductors, while one of said plurality of row conductors is being driven with said predetermined row voltage level;

driving one at a time each of said plurality of column conductors with a predetermined column voltage level; and

monitoring each of said plurality of row conductors for a given voltage drop corresponding to a closed one of said plurality of switches to a driven one of said column conductors, while one of said plurality of column conductors is being driven with said predetermined column voltage level;

wherein a number of said plurality of switches is increased by said persistent connection exceeding a total number obtained by multiplying together a number of said plurality of row conductors and a number of said plurality of column conductors.